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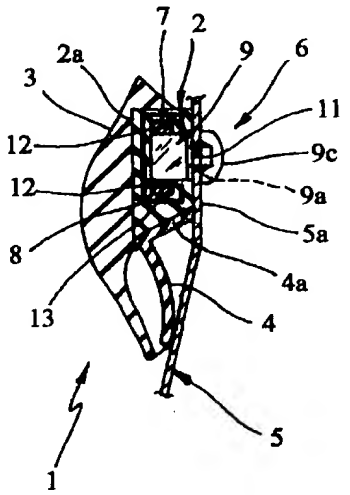
(54) A process for manufacturing a moulding element for motorcar bodies

(57) A process for manufacturing a moulding element for car bodies comprising the steps of: manufacturing a main body (2) of elongated conformation and manufacturing a continuous support element (7) carrying attachment projections (9) which are then connected with the main body (2) for engaging a corresponding anchoring region (5a) formed on a car body (5). In particular the attachment projections (9) are rigidly in engagement with the continuous support element (7) which is fitted by sliding in a longitudinal housing (10) formed in the main body (2)and then axially fixed to this latter.

Fig. 2



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Description

[0001] The present invention relates to a process for manufacturing a moulding element for motorcar bodies.

[0002] In particular, the moulding element in reference is intended for being applied as finish and/or protection to motorcar bodies and more specifically to parts thereof such as doors, bumpers, edge areas at the lower perimeter of the car body, and so on.

[0003] It is known that moulding elements for uses as briefly described above are traditionally comprised of a strip, typically of plastic material, which is provided with appropriate attachment means for association with the intended body portion.

[0004] In particular, presently there are different typologies of moulding elements depending on the different attachment systems used for anchoring to the car body.

[0005] In a first known typology of moulding elements, the strip of plastic material is anchored by use of adhesives and more specifically double-sided adhesive tapes interposed between the car body and one side of the moulding element.

[0006] Drawbacks of this type of anchoring are well apparent: precariousness in connection, unreliability in time, great responsiveness to weathering and dynamic stresses.

[0007] In a second type of known typology, the attachment means consists of nails or studs fastened, by welding for example, to the car body and suitably covered with plastic material so that they can be fitted, by snap or interference fit, into corresponding housings formed in a coupling face of the moulding element.

[0008] Surely, this second type of known typology is more reliable than the previously described one. However, it is to note that, due to the fact that a plurality of nails or studs are to be made and connected to the car body, a great complication in terms of construction is involved and necessarily lack of precision may occur in working which, in conclusion, will bring about high production costs and often poor quality of the product. More precisely, possible lack of precision in the size and/or placement of the attachment nails or studs gives rise to an inappropriate fastening of the strip or moulding element and consequent deformation of same, which will give rise to an irreparable lack of levelness and reduced respect of geometric tolerances, in particular with reference to the outer surface of the moulding element. These consequences are clearly unacceptable from an aesthetic point of view.

[0009] In an attempt to solve the mentioned drawbacks, a third typology of moulding elements has been recently widespread, in which the moulding element has a longitudinal housing intended for receiving, by snap-fitting, a plurality of coupling elements which are positioned in the longitudinal housing at locations spaced apart the same distance from each other.

[0010] More specifically, the moulding element comprises an elongated main body, to be obtained by extrusion or moulding, in which the longitudinal housing is defined. Said housing, on the moulding element side to be turned to the car body, has an opening or slit from which the coupling element can partly emerge. In more detail, at the opening or slit, millings or cuttings are formed at regular intervals so as to enable insertion of each of the coupling elements while at the same time defining axial locating surfaces into which the coupling elements are snap-locked.

[0011] The different coupling elements, once they have been suitably linked to each other, will each have at least one projection emerging in a direction substantially perpendicular to the longitudinal housing in order to engage corresponding slots formed in the car body.

[0012] Although the last mentioned construction of known type is surely valid as regards anchoring and operating reliability, it has shown important drawbacks too.

[0013] In particular, since millings are to be executed at the longitudinal housing for access of the coupling elements, an additional working step is clearly involved which will bring about additional production costs. Furthermore, since the main body in which milling is carried out is typically made of a material having good mechanical features, and sometimes is even made of two materials, milling operations are not easy.

[0014] It is also to note that milling or cutting operations give rise to an important weakening in the structure forming the moulding element, thereby inevitably involving deformations and in particular surely unaesthetical undulations that reduce levelness and observance of the geometrical tolerances in the outer surface of the moulding element. Furthermore, due to the great rigidity of the section member and the presence in many cases of metal cores, problems may arise in carrying out maintenance of the abrasive elements for executing the milling operations, which will result in high working costs and product waste.

[0015] In addition, the residual presence of possible burrs can cause abrasions and scratches on the painted portions of the car body.

[0016] Under this situation, it is a fundamental object of the present invention to provide a new process for making a moulding element for car bodies and a moulding element so obtained that, in addition to affording high performance in terms of strength and reliability in time as regards anchoring to the body, is also of cheap production and easy assembling, without on the other hand involving an important increase in material consumption.

[0017] The foregoing and further objects that will become more apparent in the progress of the present description are substantially attained by a process for making a moulding element in accordance with the description of the appended claims.

[0018] Further features and advantages will be best understood from the detailed description of a preferred but non-exclusive embodiment of a process for making

a moulding element and a moulding element in accordance with the invention. The description is given hereinafter by way of non-limiting example with reference to the accompanying drawings, in which:

- Fig. 1 is a fragmentary plan view relating to a coupling side of a moulding element obtained by means of a process in accordance with the present invention;
- Fig. 2 is a cross-sectional view taken along line II-II in Fig. 1 showing the moulding element of figure 1 when engaged to a car body;
- Fig. 3 is a fragmentary longitudinal view in which attachment means for engagement of the moulding element in accordance with the invention with a car body is highlighted; and
- Fig. 4 is a plan view from top of the attachment means shown in Fig. 3.

[0019] With reference to the drawings and in particular to Figs. 1 and 2, a moulding element for body cars has been generally identified by reference numeral 1.

[0020] As already mentioned, the moulding element 1 can be employed as a protection element, aesthetic surface finish or covering element at various regions of a car body, on the sides of the body at the lower edge thereof for example, at the front and rear bumpers, on doors, and so on.

[0021] The moulding element 1 is comprised of a main body 2 optionally provided with a metal core of an elongated conformation and to be obtained by extrusion, moulding, or other operations, for example.

[0022] The main body has an outer side 2a with which a surface-finish covering 3 is associated; since this covering is to be rigidly coupled with the main body, preferably it can be joined thereto by injection moulding techniques or coextrusion with the main body. Preferably, although not necessarily, the main body may also be provided with a flexible sealing lip 4 substantially extending over the whole longitudinal extension of the moulding element 1 and having a base portion 4a rigidly engaged with the main body 2. From a construction point of view, coupling between the main body 2 and sealing lip 4 can be obtained by several different techniques, by coextrusion of them for example, carried out continuously.

[0023] In order to achieve engagement of the main body 2, hence the moulding element 1, with a corresponding anchoring region 5a formed on the car body 5, attachment means 6 is provided which is operatively associated with the main body at an inner side 2b of said main body opposite to said outer side 2a.

[0024] In an original manner, the attachment means comprises a continuous support element 7 substantially extending over the whole longitudinal extension of the main body 2 and linked to the latter preferably by fitting in a corresponding longitudinal housing 8 formed in the inner side 2b of the main body 2.

[0025] The continuous support element 7 is arranged to carry a predetermined number of attachment projections 9 that are rigidly fixed and placed at a given distance from each other. In other words, the continuous support element 7 practically constitutes a rigid connecting element between the different attachment projections 9 so that said projections are joined together in a predetermined number, conveniently spaced apart by a preestablished pitch and in mutual alignment relationship.

[0026] In more detail, it is to note that the longitudinal housing 8 formed in the main body 2, seen in transverse section has a longitudinal opening 10, also extending substantially over the whole length of the moulding element, arranged to enable said projections 9 to emerge at least partly from the longitudinal housing in order to engage, as mentioned, slots 11 formed in the car body. Still referring to the transverse section, the longitudinal housing 8 has at least one undercut 12 arranged to act and abut against a corresponding abutment portion 13 of the continuous support element 7 to prevent it from being drawn out through the longitudinal opening. It is to note that, in the embodiment shown, two undercuts 12 are preferably provided, for symmetry purposes, and they cooperate with respective abutment portions 13. Practically, both the continuous support element 7 and the longitudinal housing 8 have a transverse bulkiness greater than that of the longitudinal opening 10 at least at predetermined lengths thereof, so that the continuous support element 7 may be received in the housing 8 without being drawn out therefrom through the longitudinal opening 10.

[0027] Actually, in order to enable coupling of the attachment means 6 with the main body 2 during the assembling step, the longitudinal housing 8 is provided to have, at at least one of its ends, a fitting opening 8a to receive the continuous support element 7 which may pass through the fitting opening itself and may be caused to slide in the housing 8 until it reaches the desired axial positioning.

[0028] Once the attachment means 6 is conveniently positioned relative to the main body 2, the continuous element is axially fastened by use of axial lock means 14 operatively interposed between the main body and the continuous support element.

[0029] More specifically, this axial lock means may be conventional locking members of the screw-threaded type for example or, as in the embodiment shown in Fig. 4, a slot 15 having a dovetail-shaped undercut for example, adapted to receive a corresponding portion integral with the main body. It is to note that in the embodiment shown the finish covering 3, once rigidly associated with the main body 2, will have a portion adapted to be inserted in the axial-lock slot 15 formed in the continuous support element 7, so as to retain said element in the axial direction.

[0030] Referring now to the particular structure of the attachment means 6, it is to note that projections 9 can

be of one piece construction with or, alternatively, inserted by snap-fitting, threaded or interference fitting, in the continuous support element which preferably has lightening reliefs 16 disposed at regular intervals between consecutive projections 9.

[0031] These reliefs can be particularly useful for fastening of support 2 within an injection mould where finish covering 3 is carried out.

[0032] It is obvious that in any case the continuous support element can be also formed of a small base or strip devoid of reliefs without, on the other hand, necessarily losing its operational character.

[0033] As particularly shown in Figs. 2, 3 and 4, each of the attachment projections 9 comprises a portion 9a for connection with the continuous support element 7, a connecting neck 9b emerging from said connecting portion 9a away from the continuous support element 7 and adapted, under operating conditions, to pass through the longitudinal opening 10 and possibly the slot on the car body 5, and a head 9c, placed at the end of said connecting neck 9b and having a transverse section of swollen conformation relative to the connecting neck. It is to note that the head of each projection is practically the portion intended for engagement of the corresponding housings or slots 11 formed in the anchoring region 5a of the car body 5 (see Fig. 2).

[0034] Finally, from the point of view of materials, it is to note that the continuous support element 7 and projections 9 can be made, by moulding for example, of:

- polyoxymethylene;
- acetal resins;
- reinforced polyamides;
- thermoplastic or thermosetting materials possibly reinforced with fibres of various nature adapted for the purpose;
- metal alloys.

[0035] In turn, the main body 2 and covering 3 can be respectively made of:

extruded PVC compounds with a metal or fibre core, or any other thermoplastic or thermosetting material or vulcanized rubbers adapted to the purpose, reinforced or not with fibres or metal cores, and of:
PVC compounds of the soft type for example, so as to better absorb possible shocks, or any other thermoplastic or thermosetting material or vulcanized rubbers adapted to the purpose.

[0036] The invention achieves important advantages.

[0037] It is first to note that the moulding element obtained by means of the process in accordance with the present invention substantially solves all drawbacks typical of the embodiments of known type, while ensuring an efficient anchoring, high operating reliability and reduced costs, as regards both production of the different elements forming it and assembling of them.

[0038] It should be in particular recognized that all milling and/or cutting operations necessary for a correct fastening of the attachment means 6 to the main body 2 are substantially eliminated.

[0039] In addition, due to the particular conformation of the continuous element 7 integrally carrying a plurality of attachment projections, positioning of all projections can be carried out by a single operation, thereby greatly saving time in assembling.

[0040] In addition to enabling time to be saved in construction and assembling, the moulding element 1 in reference Is also very valid because problems of structural weakening are substantially eliminated due to the absence of material-removal operations and, above all, occurrence of permanent deformations or undulations on the substantially finished workpiece is completely excluded.

[0041] In conclusion, therefore, the moulding element in accordance with the invention can be produced at reduced costs although it reaches qualitative results hardly achievable and only at prohibitive costs with known systems, as regards both observance of geometrical tolerances and mechanical strength.

Claims

1. A process for manufacturing a moulding element for motorcar bodies comprising the following steps:

   - manufacturing a main body (2) of elongated conformation and presenting a longitudinal housing (8) provided with a fitting opening (8a) at at least one of its ends, the longitudinal housing (8), seen in transverse cross section, having a longitudinal opening (10) extending substantially over the whole lenght of the moulding element and at least one undercut (12);
   - manufacturing attachment means (6) comprising a continuous support element (7) rigidly carrying a number of projections (9) disposed at a predetermined distance from a each other, characterized by the fact that said process further includes the following steps:
   - coupling the continuous support element (7) to the main body (2) by inserting the support element through the fitting opening (8a) and by sliding said support element in the housing until it reaches the desired axial positioning;
   - axially fastening the continuous support element (7) to the main body (2) once said support element is conveniently positioned relative to the main body itself, thereby obtaining a moulding element which is adapted for engagement to slots or housings (11) formed on an anchoring region of a car body (5).

2. A process according to claim 1, characterized by the fact that the main body (2) is manufactured by extrusion or by moulding.

3. A process according to anyone of the preceeding claims, characterized by the fact that the main body (2) is provided with a metal core of an alongated conformation.

4. A procees according to anyone of the preceeding claims, characterized by the fact that after the step of manufacturing the main body, the further step of coupling the main body (2) with a sealing lip (4) is provided with.

5. A process according to claim 4, characterized by the fact that the sealing lip (4) is coupled with the main body (2) by coestrusion carried out continously.

6. A process accordin to anyone of the preceeding claims, characterized by the fact that after the step of coupling the continuous support element to the main body the step of joining a finish covering (3) to the main body is provided with.

7. A process according to claim 6, characterized by the fact that the finish covering (3) is joined to the main body by injection moulding or by coestrusion.

8. A process according to claim 7, characterized by the fact the finish covering (3) joined to the main body (2) by injection moulding presents a portion adapted to be inserted in an axial-lock slot (15) formed in the continuous support element (7) so as to achieve the axial fastening of the continuous support element (8) to the main body (2).

9. A process according to claim 1, characterized by the fact that said axial fastening of the continuous support element (7) to the main body (2) is obtained by screw locking of the continuous support element to the main body itself.

10. A process according to anyone of claims 1 to 9, characterized by the fact that said continuous support element (7) extends substantially over the whole lenght of the main body.

11. A process according to anyone of claims 1 to 10, characterized by the fact that said projections (9) are spaced a part by a pre-estabilished pitch in mutual alignment relashionship.

12. A process according to anyone of claims 1 to 11, characterized by the fact that once the support element (7) has been inserted inside the housing (8), said projections (9) are so shaped as to emerge at least partly from said longitudinal housing (8), said undercut (12) being arranged to act and abut against the corresponding abutment portion (13) of the continuous support element (7) to prevent the attachment means (6) and in particular said projections (9) from being drawn out through said longitudinal opening (10).

13. A process according to claim 12, characterized by the fact that each of said attachment projections (9) comprises a portion (9a) for connection with the continuous support element, a connecting neck (9b) emerging from said connecting portion and intented, under opering conditions, for passing through said longitudinal opening (10), and a head (9c) placed at the end of said connecting neck and having, in cross section, a swollen conformation relative to said neck, said head being arranged to the engage corresponding housings or slots (11) formed in an anchoring region (5a) of the car body (5) to which the moulding element is to be associated with.

14. A process according to the claim 1, characterized by the fact that said attachment projections are of one piece contruction with the continuous suport element (7).

15. A process according to the claim 1, charaterized by the fact that the continuous support element is provided with lightening reliefs (16) disposed at regular intervals between the consecutive projection (9).

16. A moulding element obtained by means of the manufacturing process according to anyone of the preceeding claims.

Fig. 2

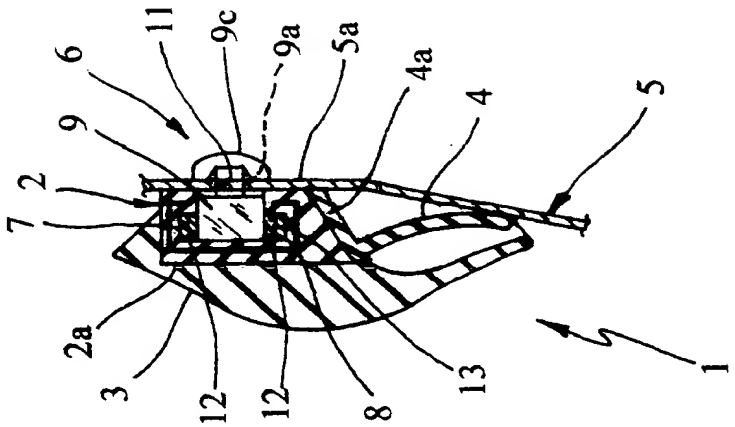
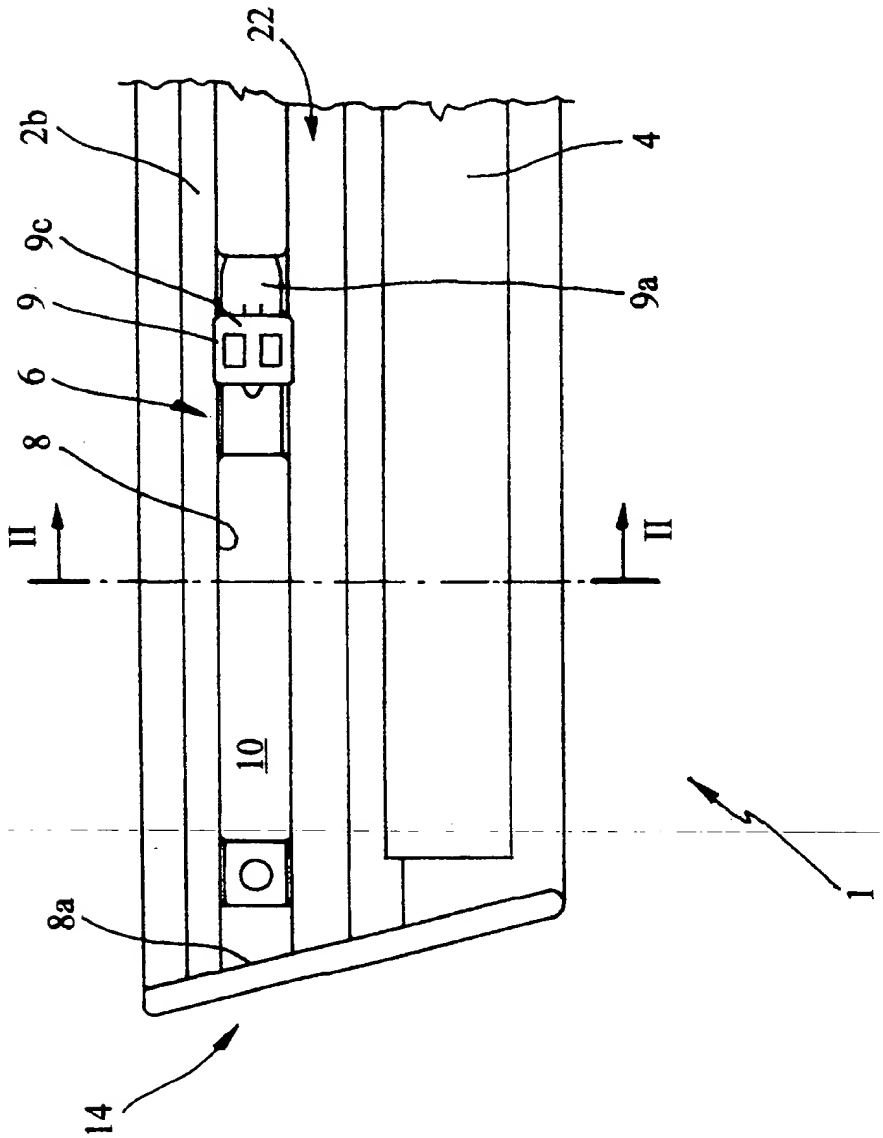


Fig. 1



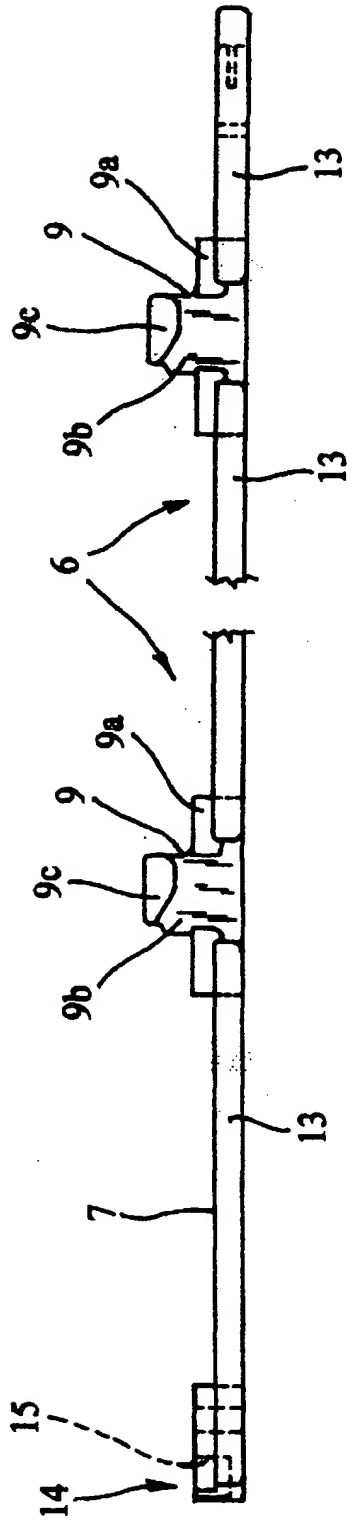


Fig. 3

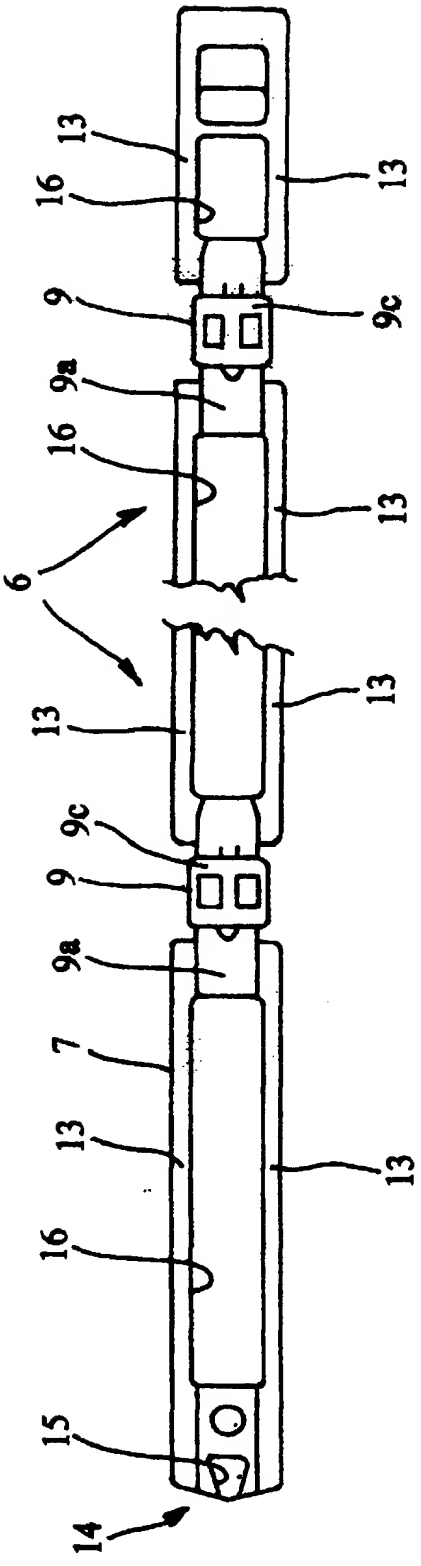


Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 4123

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 April 1999	Kusardy, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 10 4123

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